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EXAMINER	
KIM, CHONG R	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/766,238	LAINEMA ET AL.	
	Examiner	Art Unit	
	Charles Kim	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 August 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *40-107* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *40-107* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/12/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment and Arguments

1. Applicant's amendment filed on August 27, 2004 has been entered and made of record.

2. In view of applicant's newly submitted drawings, the objection to the drawings are withdrawn.

3. In view of applicant's amendment, the objection to the specification is withdrawn.

4. In view of applicant's amendment, the objections to the claims are withdrawn.

5. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

6. Claim 44 is objected to because there appears to be a typographical error in the phrase "according to claim 4". The Examiner notes that claim 4 is no longer pending. For examination purposes, claim 44 will be interpreted as being dependent from claim 43. Appropriate correction is required.

7. Claims 94-96 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Note that claim 94 does not appear to further limit the subject

matter of a previous claim, but rather incorporates the subject matter of the previous claim(s) (claim 58, 65, 76, or 83).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 40, 45-48, 51, 55, 58, 61-64, 76, 79-82, 91, 94 are rejected under 35 U.S.C. 102(e) as being anticipated by Andrew, U.S. Patent No. 6,563,958 ("Andrew").

Referring to claim 40, Andrew discloses a method for reducing visual artifacts in a digital image comprising a plurality of image blocks in which image blocks are encoded to form encoded image blocks and the encoded image blocks are subsequently decoded to form decoded image blocks, each decoded image block comprising a number of reconstructed pixels (col. 3, line 37-col. 4, line 4), each reconstructed pixel having an associated pixel value and filtering is performed to reduce visual artifacts due to a boundary between a current decoded image block and a previously decoded image block adjacent to the current decoded block such that the pixel value of at least one reconstructed pixel in at least one of the current decoded image block and the previously decoded image block is modified by filtering to produce a modified pixel value (col. 4, line 5-col. 5, line 35), wherein the modified pixel value is made available for use in

filtering and/or prediction of a pixel value in an image block to be subsequently encoded or decoded (col. 5, lines 1-65).

Andrew explains that a vertical boundary may be filtered by filtering the rows across the boundary, while a horizontal boundary may be filtered by filtering the columns across the boundary (col. 5, lines 6-11). Andrew also explains that the blocks are processed in a raster scan order (col. 5, lines 41-42). An example is given below to illustrate how the modified pixel is made available for use in a subsequent filtering step. A boundary filtering process for a 2 X 2 block image containing four blocks will be described (Note that the blocks are labeled 1-4 in a corresponding raster scan order). First, the vertical boundary between block 1 and block 2 is removed by filtering the rows across the boundary, as noted above. Note that only four pixels on either side of the boundary are filtered (col. 5, lines 12-14 and figure 4). In this case, four pixels to the left (block 1 row pixels) and four pixels to the right (block 2 row pixels) of the boundary are filtered along the entire vertical boundary. Next, the horizontal boundary between block 3 and block 1 is removed by filtering the columns across the horizontal boundary. Again, only four pixels above (block 1 column pixels) and four pixels below (block 3 column pixels) the boundary are filtered along the entire horizontal boundary. The Examiner notes that the pixels that were modified during the filtering process (the block 1 row pixels) for removing the vertical boundary between block 1 and block 2 are made available for the filtering process for removing the horizontal boundary between block 1 and block 3 (block 1 column pixels). More specifically, the pixels that are located on the bottom right corner of block 1 will be modified during the filtering process for removing the vertical boundary between block 1 and block 2.

These modified pixels in the block 1 will be made available, and further modified during the subsequent filtering process for removing the horizontal boundary between block 1 and block 3.

Referring to claim 45, Andrew further discloses that the modification of the value of at least one reconstructed pixel in at least one of the current decoded image block and the previous decoded image block by filtering is performed immediately after the current decoded image block is formed and a boundary exists between the current decoded image block and the previously decoded image block (col. 5, lines 1-63 and figure 3).

Referring to claim 46, Andrew further discloses that the filtering is performed before all blocks of the digital image are decoded (col. 5, lines 1-63 and figure 3).

Referring to claim 47, Andrew further discloses that it is determined whether more than one boundary exists between the current decoded image block and previously decoded image blocks, wherein if more than one boundary exists, then filtering is performed on the more than one boundary available for filtering to reduce visual artifacts due to the more than one boundary (col. 5, lines 1-63).

Referring to claim 48, Andrew further discloses that filtering to reduce visual artifacts due to the more than one boundary is performed sequentially on the more than one boundary in a certain order (col. 5, lines 1-63. Note that the two boundaries will be filtered in a certain order).

Referring to claim 51, see the rejection (more specifically, the example provided) of at least claim 1 above.

Referring to claim 55, Andrew further discloses that the digital image comprises at least one segment of image blocks and that only boundaries between adjacent decoded image blocks that belong to the same segment are filtered (col. 3, lines 45-48 and col. 5, lines 68-49).

Referring to claim 58, see the rejection of at least claim 40 above. Andrew discloses an encoder (602) for encoding a digital image comprising a plurality of image blocks, the encoder comprising means for encoding image blocks to form encoded image blocks (col. 3, lines 1-36 and figure 6) and means for subsequently decoding the encoded image blocks to form decoded image blocks, each decoded image block comprising a number of reconstructed pixels, each reconstructed pixel having an associated pixel value (col. 3, line 37-col. 4, line 3), the encoder comprising a filter for reducing visual artifacts due to a boundary between a current decoded image block and a previously decoded image block adjacent to the current decoded block, the filter being arranged to modify the pixel value of at least one reconstructed pixel in at least one of the current decoded image block and the previously decoded image block by filtering to produce a modified pixel value (col. 4, line 5-col. 5, line 35 and col. 5, line 66-col. 6, line 14), wherein the encoder is arranged to make the modified pixel value available for use in filtering and/or prediction of a pixel value in an image block to be subsequently encoded (col. 5, lines 1-65).

Referring to claim 61, see the rejection of at least claim 45 above.

Referring to claim 62, Andrew further discloses that the filter is arranged to reduce visual artifacts due to more than one boundary between the current decoded image block and at least one other previously decoded image block (col. 5, lines 3-64).

Referring to claim 63, see the rejection of at least claim 47 above.

Referring to claim 64, see the rejection of at least claim 40 above.

Referring to claim 76, see the rejection of at least claim 40 above. Andrew discloses a decoder (602) for decoding an encoded digital image, the encoded digital image comprising a

plurality of encoded image blocks and having been formed by encoding a digital image comprising a plurality of image blocks, the decoder comprising means for decoding the encoded image blocks to form decoded image blocks, each decoded image block comprising a number of reconstructed pixels, each reconstructed pixel having an associated pixel value (col. 3, line 8-col. 4, line 3 and col. 5, line 65-col. 6, line 14), the decoder comprising a filter for reducing visual artifacts due to a boundary between a current decoded image block and a previously decoded image block adjacent to the current decoded block, the filter being arranged to modify the pixel value of at least one of the current decoded image block and the previously decoded image block by filtering to produce a modified pixel value (col. 4, line 5-col. 5, line 35), wherein the decoder is arranged to make the modified pixel value available for use in filtering and/or prediction of a pixel value in an image block to be subsequently decoded (col. 5, lines 1-65).

Referring to claim 79, Andrew further discloses that the filter is arranged to modify the value of at least one reconstructed pixel in at least one of the current decoded image block and the previously decoded image block immediately after the current decoded image block is formed and a boundary exists between the current decoded image block and the previously decoded image block (col. 5, lines 3-63 and figure 3).

Referring to claim 80, see the rejection of at least claim 62 above.

Referring to claim 81, see the rejection of at least claim 63 above.

Referring to claim 82, see the rejection of at least claim 64 above.

Referring to claim 91, see the rejection of at least claim 55 above.

Referring to claim 94, Andrew further discloses a terminal (figure 6) comprising the encoder of claim 58.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 41-44, 50, 59, 60, 77, 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Andrew, U.S. Patent No. 6,563,958 ("Andrew") and Osa, U.S. Patent No. 6,496,605 ("Osa").

Referring to claim 41, Andrew does not explicitly disclose that the encoding of an image block to form an encoded image block is performed using motion compensated prediction of at least one pixel value with respect to a reference image using the modified pixel value. However, this feature was exceedingly well known in the art. For example, Osa discloses the step of encoding an image block to form an encoded image block by using motion compensated prediction of at least one pixel value with respect to a reference image using a modified (block boundary filtered) pixel value (col. 4, lines 20-64, col. 9, lines 6-35, and figure 8).

Andrew and Osa are combinable because they are both concerned with filtering the block boundaries in a digital image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the encoding process of Andrew so that it is performed using motion compensated prediction, as taught by Osa. The suggestion/motivation for doing so would have been to provide a block boundary filtering performance that is much

more powerful than typical filtering systems (Osa, col. 9, lines 30-35). Therefore, it would have been obvious to combine Andrew with Osa to obtain the invention as specified in claim 41.

Referring to claim 42, Osa further discloses that the decoding of an encoded image block to form a decoded image block is performed using motion compensated prediction of at least one pixel value with respect to a reference image using the modified pixel value (col. 4, lines 20-64, col. 9, lines 6-35, and figure 9).

Referring to claim 43, Andrew does not explicitly disclose that the encoding of an image block to form an encoded image block is performed using intra prediction of at least one pixel value with reference to a previously encoded and subsequently decoded image block of the digital image using the modified pixel value. However, this feature was exceedingly well known in the art. For example, Osa discloses the step of encoding an image block to form an encoded image block by using intra prediction of at least one pixel value with reference to a previously encoded and subsequently decoded image block of a digital image using a modified (block boundary filtered) pixel value (col. 4, lines 20-64, col. 9, lines 6-35, and figure 8).

Andrew and Osa are combinable because they are both concerned with filtering the block boundaries in a digital image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the encoding process of Andrew in view of Osa. The suggestion/motivation for doing so would have been to provide a block boundary filtering performance that is much more powerful than typical filtering systems (Osa, col. 9, lines 30-35). Therefore, it would have been obvious to combine Andrew with Osa to obtain the invention as specified in claim 43.

Referring to claim 44 as best understood, Osa further discloses that the decoding of an encoded image block to form a decoded image block is performed using intra prediction of at least one pixel value with reference to a previously encoded and subsequently decoded image block of the digital image using the modified pixel value (col. 4, lines 20-64, col. 9, lines 6-35, and figure 9).

Referring to claim 50, Andrew does not explicitly disclose that the filtering to reduce visual artifacts due to a boundary between a current decoded image block and a previously decoded image block adjacent to the current decoded block is performed during encoding of the image blocks in an image encoder to form encoded image blocks and further during decoding of the encoded image blocks in a corresponding image decoder. However, this feature was exceedingly well known in the art. For example, Osa discloses a filtering process to reduce visual artifacts due to a boundary between a two adjacent decoded image blocks during encoding of the image blocks in an image encoder to form encoded image blocks and further during decoding of the encoded image blocks in a corresponding image decoder (figures 8-9).

Andrew and Osa are combinable because they are both concerned with filtering the block boundaries in a digital image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the filtering process of Andrew in view of Osa. The suggestion/motivation for doing so would have been to provide a block boundary filtering performance that is much more powerful than typical filtering systems (Osa, col. 9, lines 30-35). Therefore, it would have been obvious to combine Andrew with Osa to obtain the invention as specified in claim 50.

Andrew and Osa do not explicitly disclose that the order of filtering boundaries used during decoding is the same as that during encoding. However, the Examiner notes that this feature would have been obvious in Andrew and Osa. The suggestion/motivation for doing so would have been to provide a complementary decoder that is capable of properly decoding the encoded image blocks (Andrew, col. 3, lines 54-56).

Referring to claim 59, see the rejection of at least claim 41 above.

Referring to claim 60, see the rejection of at least claim 43 above.

Referring to claim 77, see the rejection of at least claim 41 above.

Referring to claim 78, see the rejection of at least claim 43 above.

10. Claims 49, 53, 66, 95-96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andrew, U.S. Patent No. 6,563,958 ("Andrew").

Referring to claim 49, Andrew discloses the step of filtering the boundary to the left of the current block and the boundary to the top of the current block (col. 5, lines 35-49), but does not explicitly disclose that the order of filtering boundaries is selected such that a boundary to the left of the current decoded image block is filtered before a boundary to the top of the current decoded image block. However, the Examiner notes that the specific filtering order is not considered a patentable distinction, since it would have been chosen by the user during experimentation in order to meet his/her specific requirements. Therefore, it would have been obvious to modify Andrew's filtering process so that the boundary to the left of the current block is filtered before a boundary to the top of the current block is filtered; since no new or unexpected results are seen to be attained by that specific filtering order.

Referring to claim 53, see the rejection of at least claim 49 above.

Referring to claim 66, see the rejection of at least claim 53 above.

Referring to claims 95-96, Andrew does not explicitly disclose that the terminal is a wireless terminal of a mobile communications system. However, Official notice is taken that a wireless terminal of a mobile communications system was exceedingly well known in the art. Therefore, it would have been obvious to modify the terminal of Andrew so that it is a wireless terminal of a mobile communications system. The suggestion/motivation for doing so would have been to enhance the mobility/flexibility of the system.

11. Claims 52, 54, 65, 67-73, 83-90, 97-99, 102, 105 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Andrew, U.S. Patent No. 6,563,958 ("Andrew") and Keith et al., U.S. Patent No. 5,493,513 ("Keith").

Referring to claim 52, see the discussion of claim 40 above. Andrew discloses a method for reducing visual artifacts in a digital image comprising a plurality of image blocks in which image blocks are encoded to form encoded image blocks and the encoded image blocks are subsequently decoded to form decoded image blocks, each decoded image block comprising a number of reconstructed pixels (col. 3, line 37-col. 4, line 4), each reconstructed pixel having an associated pixel value and filtering is performed to reduce visual artifacts due to a boundary between a current decoded image block and a previously decoded image block adjacent to the current decoded block such that the pixel value of at least one reconstructed pixel in at least one of the current decoded image block and the previously decoded image block is modified by filtering to produce a modified pixel value (col. 4, line 5-col. 5, line 35), wherein the digital

image is filtered block by block according to a certain scanning order, and that the modified pixel value is made available for use in filtering and/or prediction of a pixel value in an image block to be subsequently encoded or decoded (col. 5, lines 1-65).

Andrew does not explicitly disclose that the image blocks are grouped into macroblocks. However, this feature was exceedingly well known in the art. For example, Keith discloses image blocks that are grouped into macroblocks, wherein the digital image is processed macroblock by macroblock according to a certain scanning order (col. 6, lines 15-28 and figure 5).

Andrew and Keith are combinable because they are both concerned with filtering the block boundaries in a digital image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image blocks of Andrew so that they are grouped into macroblocks, as taught by Keith. The suggestion/motivation for doing so would have been to enhance the processing speed of the encoding and decoding process (Keith, col. 1, lines 10-56). Therefore, it would have been obvious to combine Andrew with Keith to obtain the invention as specified in claim 52.

Referring to claim 54, Andrew further discloses that the filtering to reduce visual artifacts due to a boundary between a current decoded image block and a previously decoded image block adjacent to the current decoded block is performed for all boundaries within an image block before filtering to reduce visual artifacts is performed within the next image block in the scanning order (col. 5, lines 12-65 and figure 3). However, Andrew does not explicitly disclose that the filtering is performed on all boundaries within a macroblock before filtering the next macroblock in the scanning order.

Keith discloses the step of processing all the image blocks of a given macroblock in a macroblock scanning order before processing image blocks of the next macroblock in the macroblock scanning order (col. 6, lines 15-28 and figure 5). Accordingly, the combination of Andrew and Keith disclose that the filtering is performed on all boundaries within a macroblock before filtering the next macroblock in the scanning order.

Referring to claim 65, see the discussion of at least claim 40 above. Andrew discloses an encoder (602) for encoding a digital image comprising a plurality of image blocks which are grouped into image blocks, the encoder comprising means for encoding image blocks to form encoded image blocks (col. 3, lines 1-36 and figure 6), and means for subsequently decoding the encoded image blocks to form decoded image blocks, each decoded image block comprising a number of reconstructed pixels, each reconstructed pixel having an associated pixel value (col. 3, line 37-col. 4, line 3), the encoder comprising a filter for reducing visual artifacts due to a boundary between a current decoded image block and a previously decoded image block adjacent to the current decoded block, the filter being arranged to modify the pixel value of at least one reconstructed pixel in at least one of the current decoded image block and the previously decoded image block by filtering to produce a modified pixel value (col. 4, line 5-col. 5, line 64 and col. 5, line 66-col. 6, line 14), wherein the encoder is arranged to encode and subsequently decode the image block by block according to a certain image block scanning order (col. 3, line 1-col. 4, line 3 and figures 1-3), and that the encoder is arranged to make the modified pixel value available for use in filtering and/or prediction of a pixel value in an image block to be subsequently encoded (col. 5, lines 1-65).

Andrew does not explicitly disclose that the plurality of image blocks are grouped into macroblocks. However, this feature was exceedingly well known in the art. For example, Keith discloses image blocks that are grouped into macroblocks, wherein the digital image is processed macroblock by macroblock according to a certain scanning order (col. 6, lines 15-28 and figure 5).

Andrew and Keith are combinable because they are both concerned with filtering the block boundaries in a digital image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image blocks of Andrew so that they are grouped into macroblocks, as taught by Keith. The suggestion/motivation for doing so would have been to enhance the processing speed of the encoding and decoding process (Keith, col. 1, lines 10-56). Therefore, it would have been obvious to combine Andrew with Keith to obtain the invention as specified in claim 65.

Referring to claim 67, see the rejection of at least claim 54 above.

Referring to claim 68, Andrew further discloses that the encoder is arranged to encode and subsequently decode the image blocks in a certain block scanning order (col. 3, lines 1-67 and col. 5, lines 35-65). As noted above (claim 65), Keith discloses image blocks that are grouped into macroblocks, wherein the image blocks of a macroblock are encoded and subsequently decoded according to a certain block scanning order (col. 6, lines 15-28 and figure 5). Accordingly, the combination of Andrew and Keith disclose the step of encoding and subsequently decoding the image blocks of a macroblock in a certain block scanning order.

Referring to claim 69, Andrew further discloses the step of encoding and subsequently decoding the image blocks of a macroblock, as noted above (claim 65), but does not disclose that

the processing (encoding and subsequently decoding) is performed on all the image blocks of a given macroblock in a macroblock scanning order before processing (encoding and subsequently decoding) image blocks of the next macroblock in the macroblock scanning order.

Keith discloses the step of processing (encoding and decoding) all the image blocks of a given macroblock in a macroblock scanning order before processing (encoding and decoding) image blocks of the next macroblock in the macroblock scanning order (col. 6, lines 15-28 and figure 5). Note that the combination of Andrew and Keith disclose that the processing (encoding and subsequently decoding) is performed on all the image blocks of a given macroblock in a macroblock scanning order before processing (encoding and subsequently decoding) image blocks of the next macroblock in the macroblock scanning order.

Referring to claim 70, Andrew further discloses that the filter is arranged to reduce visual artifacts due to boundaries between decoded image blocks by filtering, according to the block scanning order substantially immediately after each encoded image block is decoded to form a current decoded image block and a boundary exists between the current decoded image block and a previously decoded image block adjacent to the current decoded block (col. 4, line 4-col. 5, line 64). As noted above (claim 65), Keith discloses image blocks that are grouped into macroblocks. Accordingly, the combination of Andrew and Keith disclose the step of reducing visual artifacts due to boundaries between decoded image blocks of a macroblock by filtering.

Referring to claim 71, see the discussion of at least claim 62 above.

Referring to claim 72, see the discussion of at least claim 63 above.

Referring to claim 73, see the discussion of at least claim 55 above.

Referring to claim 83, Andrew discloses a decoder (692) for decoding an encoded digital image, the encoded digital image comprising a plurality of encoded image blocks and having been formed by encoding a digital image comprising a plurality of image blocks, the decoder comprising means for decoding the encoded the image blocks to form decoded image blocks, each decoded image block comprising a number of reconstructed pixels, each reconstructed pixel having an associated pixel value (col. 3, line 9-col. 4, line 3), the decoder comprising a filter for reducing visual artifacts due to a boundary between a current decoded image block and a previously decoded image block adjacent to the current decoded block, the filter being arranged to modify the pixel value of at least one reconstructed pixel in at least one of the current decoded image block and the previously decoded image block by filtering to produce a modified pixel value, wherein the decoder is arranged to decode the image block by block according to a certain block scanning order (col. 4, line 4-col. 5, line 64 and figure 3), and that the decoder is arranged to make the modified pixel value available for use in filtering and/or prediction of a pixel value in an image block to be subsequently decoded (col. 5, lines 1-65).

Andrew does not explicitly disclose that the plurality of image blocks are grouped into macroblocks. However, this feature was exceedingly well known in the art. For example, Keith discloses image blocks that are grouped into macroblocks, wherein the digital image is processed macroblock by macroblock according to a certain scanning order (col. 6, lines 15-28 and figure 5).

Andrew and Keith are combinable because they are both concerned with filtering the block boundaries in a digital image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image blocks of Andrew so that they are

grouped into macroblocks, as taught by Keith. The suggestion/motivation for doing so would have been to enhance the processing speed of the encoding and decoding process (Keith, col. 1, lines 10-56). Therefore, it would have been obvious to combine Andrew with Keith to obtain the invention as specified in claim 83.

Referring to claim 84, see the discussion of at least claim 53 above.

Referring to claim 85, see the rejection of at least claim 54 above.

Referring to claim 86, Andrew further discloses that the image blocks are encoded by an encoder to form encoded image blocks according to a certain block scanning order (col. 3, lines 8-36), characterized in that the decoder is further arranged to decode the encoded image blocks according to the certain block scanning order (col. 3, lines 36-65). As noted above (claim 83), Keith discloses image blocks that are grouped into macroblocks, wherein the image blocks of a macroblock are encoded and decoded according to a certain block scanning order (col. 6, lines 15-28 and figure 5). Accordingly, the combination of Andrew and Keith disclose the step of encoding and decoding the image blocks of a macroblock in a certain block scanning order.

Referring to claim 87, see the rejection of at least claim 69 above.

Referring to claim 88, Andrew further discloses that the filter is arranged to reduce visual artifacts due to boundaries between decoded image blocks by filtering, according to the block scanning order substantially immediately after each encoded image block is decoded to form a current decoded image block and a boundary exists between the current decoded image block and a previously decoded image block adjacent to the current decoded block (col. 4, line 4-col. 5, line 64).

Referring to claim 89, see the discussion of at least claim 62 above.

Referring to claim 90, see the discussion of at least claim 63 above.

Referring to claim 97, see the rejection of at least claim 65 above. Andrew further discloses a storage medium comprising a computer program for operating a computer as an encoder, and the program code for performing the steps above (col. 5, line 66-col. 6, line 14 and figure 6).

Referring to claim 98, see the rejection of at least claim 83 above. Andrew further discloses a storage medium comprising a computer program for operating a computer as a decoder, and the program code for performing the steps above (col. 5, line 66-col. 6, line 14 and figure 6).

Referring to claim 99, see the discussion of at least claim 55 above.

Referring to claim 102, see the discussion of at least claim 55 above.

Referring to claim 105, see the discussion of at least claim 55 above.

12. Claims 56, 74, 92 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Andrew, U.S. Patent No. 6,563,958 ("Andrew") and Fukuda et al., U.S. Patent No. 6,434,275 ("Fukuda").

Referring to claim 56, Andrew does not explicitly disclose that the digital image comprises a luminance component and at least one chrominance component. However, this feature was exceedingly well known in the art. For example, Fukuda discloses a digital image that comprises a luminance component and at least one chrominance component, wherein filtering is performed to reduce visual artifacts due to a boundary between a current block and an adjacent block in the luminance component (col. 26, lines 34-65 and figure 25).

Andrew and Fukuda are combinable because they are both concerned with filtering the block boundaries in a digital image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the digital image of Andrew so that it comprises a luminance component and at least one chrominance component, wherein filtering is performed to reduce visual artifacts due to a boundary between a current block and an adjacent block in the luminance component, as taught by Fukuda. The suggestion/motivation for doing so would have been to provide a simple yet stable process for reducing block distortion in which omission of high-frequency components can be eliminated (Fukuda, col. 2, lines 29-40). Therefore, it would have been obvious to combine Andrew with Fukuda to obtain the invention as specified in claim 56.

Referring to claim 74, see the rejection of at least claim 56 above.

Referring to claim 92, see the rejection of at least claim 56 above.

13. Claims 57, 75, 93 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Andrew, U.S. Patent No. 6,563,958 ("Andrew") and Zhou, U.S. Patent No. 6,236,764 ("Zhou").

Referring to claim 57, Andrew does not explicitly disclose that the digital image comprises at least a first color component and a second color component. However, this feature was exceedingly well known in the art. For example, Zhou discloses an image that comprises at least a first color component (CB) and a second color component (CR), wherein filtering is performed to reduce visual artifacts due to a boundary between a current block and an adjacent block in the first color component (col. 8, lines 10-49 and step 110 in figure 5).

Andrew and Zhou are combinable because they are both concerned with filtering the block boundaries in a digital image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image of Andrew so that it comprises at least a first color component and a second color component, wherein filtering is performed to reduce visual artifacts due to a boundary between a current block and an adjacent block in the first color component, as taught by Zhou. The suggestion/motivation for doing so would have been to enhance the boundary filtering process by providing a relatively simple yet accurate boundary filtering algorithm that is fast enough for real-time applications (Zhou, col. 8, line 59-col. 9, line 5). Therefore, it would have been obvious to combine Andrew with Zhou to obtain the invention as specified in claim 57.

Referring to claim 75, see the rejection of at least claim 57 above.

Referring to claim 93, see the rejection of at least claim 57 above.

14. Claims 100, 103, 106 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Andrew, U.S. Patent No. 6,563,958 ("Andrew"), Keith et al., U.S. Patent No. 5,493,513 ("Keith") and Fukuda et al., U.S. Patent No. 6,434,275 ("Fukuda").

Referring to claim 100, Andrew and Keith do not explicitly disclose that the digital image comprises a luminance component and at least one chrominance component. However, this feature was exceedingly well known in the art. For example, Fukuda discloses a digital image that comprises a luminance component and at least one chrominance component, wherein filtering is performed to reduce visual artifacts due to a boundary between a current block and an adjacent block in the luminance component (col. 26, lines 34-65 and figure 25).

Andrew, Keith, and Fukuda are combinable because they are both concerned with filtering the block boundaries in a digital image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the digital image of Andrew and Keith so that it comprises a luminance component and at least one chrominance component, wherein filtering is performed to reduce visual artifacts due to a boundary between a current block and an adjacent block in the luminance component, as taught by Fukuda. The suggestion/motivation for doing so would have been to provide a simple yet stable process for reducing block distortion in which omission of high-frequency components can be eliminated (Fukuda, col. 2, lines 29-40). Therefore, it would have been obvious to combine Andrew and Keith with Fukuda to obtain the invention as specified in claim 100.

Referring to claim 103, see the rejection of at least claim 100 above.

Referring to claim 106, see the rejection of at least claim 100 above.

15. Claims 101, 104, 107 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Andrew, U.S. Patent No. 6,563,958 ("Andrew"), Keith et al., U.S. Patent No. 5,493,513 ("Keith"), and Zhou, U.S. Patent No. 6,236,764 ("Zhou").

Referring to claim 101, Andrew and Keith do not explicitly disclose that the digital image comprises at least a first color component and a second color component. However, this feature was exceedingly well known in the art. For example, Zhou discloses an image that comprises at least a first color component (CB) and a second color component (CR), wherein filtering is performed to reduce visual artifacts due to a boundary between a current block and an adjacent block in the first color component (col. 8, lines 10-49 and step 110 in figure 5).

Andrew, Keith, and Zhou are combinable because they are both concerned with filtering the block boundaries in a digital image. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the image of Andrew and Keith so that it comprises at least a first color component and a second color component, wherein filtering is performed to reduce visual artifacts due to a boundary between a current block and an adjacent block in the first color component, as taught by Zhou. The suggestion/motivation for doing so would have been to enhance the boundary filtering process by providing a relatively simple yet accurate boundary filtering algorithm that is fast enough for real-time applications (Zhou, col. 8, line 59-col. 9, line 5). Therefore, it would have been obvious to combine Andrew and Keith with Zhou to obtain the invention as specified in claim 101.

Referring to claim 104, see the rejection of at least claim 101 above.

Referring to claim 107, see the rejection of at least claim 101 above.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am tom 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ck
February 1, 2005

Jon Chang
Primary Examiner